FLAIM Flight Line Assessment using Icesheet Models

Eric Larour, John Schiermeier, Russel Knight and David McLaren
Jet Propulsion Laboratory, California Institute of Technology

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Chapter 1

Introduction

FLAIM is a new JPL developed software for assessing flight plans, using information provided by the ISSM (Ice Sheet System Model) ice flow model. FLAIM relies on the CLASP software for assessment of the flight plans, and ISSM for providing metrics used in the assessment. FLAIM was developed under funding by JPL's Research and Technology Development program. Project lead is Dr. Eric Larour (JPL). The core development team is comprised of Dr. John Schiermeier (ISSM-CLASP interfacing), Dr. Russel Knight (CLASP) and Dr. David McLaren (CLASP modules for ISSM).

FLAIM's main objective is to improve science return of airborne data collection campaigns such as Operation IceBridge. For a given flight plan, and a given metric (such as surface slope, bedrock slope, or observed surface velocity, among others), FLAIM will compute a quality number, which is the sum of the area covered by the flight track, multiplied by the value of the metric. Given different flight plans covering the same ground area, FLAIM will determine which flight plan has the highest quality number, thus providing quantitative informtion on the quality of flight plans. This will help flight planners improve science return according to the type of information that needs to be captured.

FLAIM will generate a quality number for each flight, along with a corresponding kml file, which color codes, on top of each flight track, the value of the metric being captured. This gives flight planners a quick idea of where a flight plan is collecting most data.

FLAIM was designed to be applied to either space borne campaign (DESDynI, IceSat-2) or airborne campaign (such as Operation IceBridge). One can provide specifications for instruments used in the data collection (swath width on the ground, airplane altitude, turn radius, etc ...) so that FLAIM can be flexibly used for different aircraft. In the future, FLAIM will be used to optimize flight plans themselves, using the assessment capability described above, to directly modify a flight plan in order to best capture the desired metric. Development of this nuew capability is scheduled for December 2011.

Chapter 2

Flight Assessments

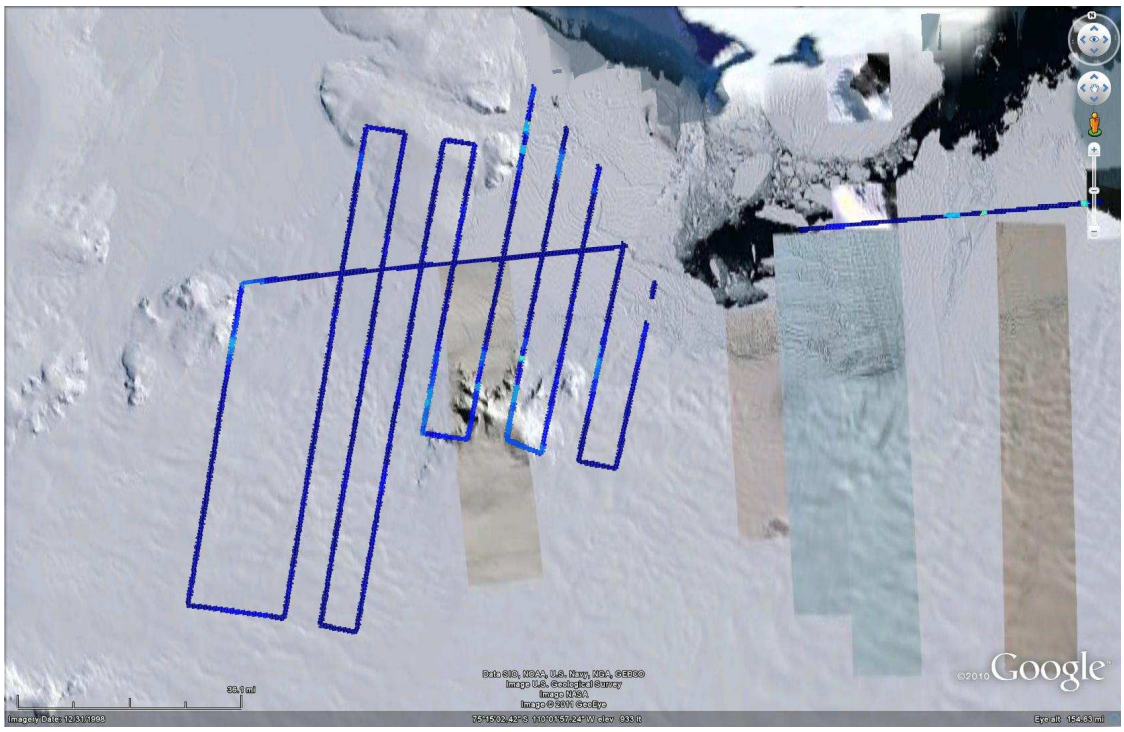


Figure 2.1: crosson1a_slope_bed: 19.2683

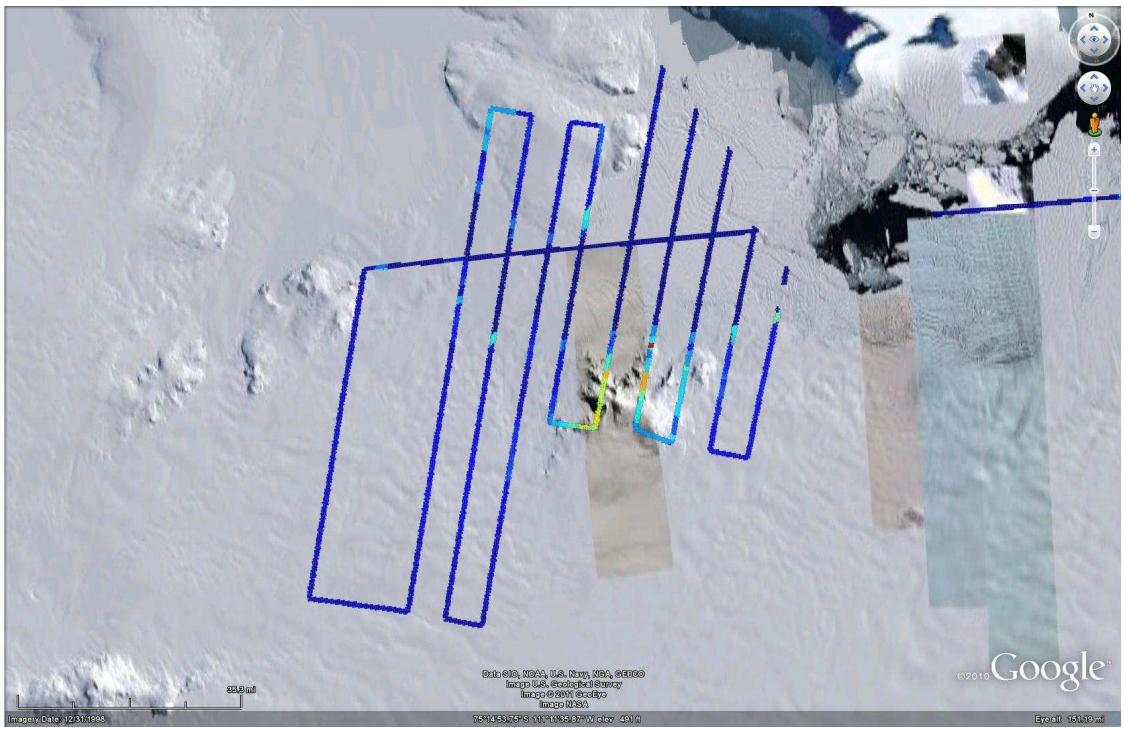


Figure 2.2: crosson1a_slope_surf: 35.7058

Figure 2.3: crosson1a_vel_obs: 655426

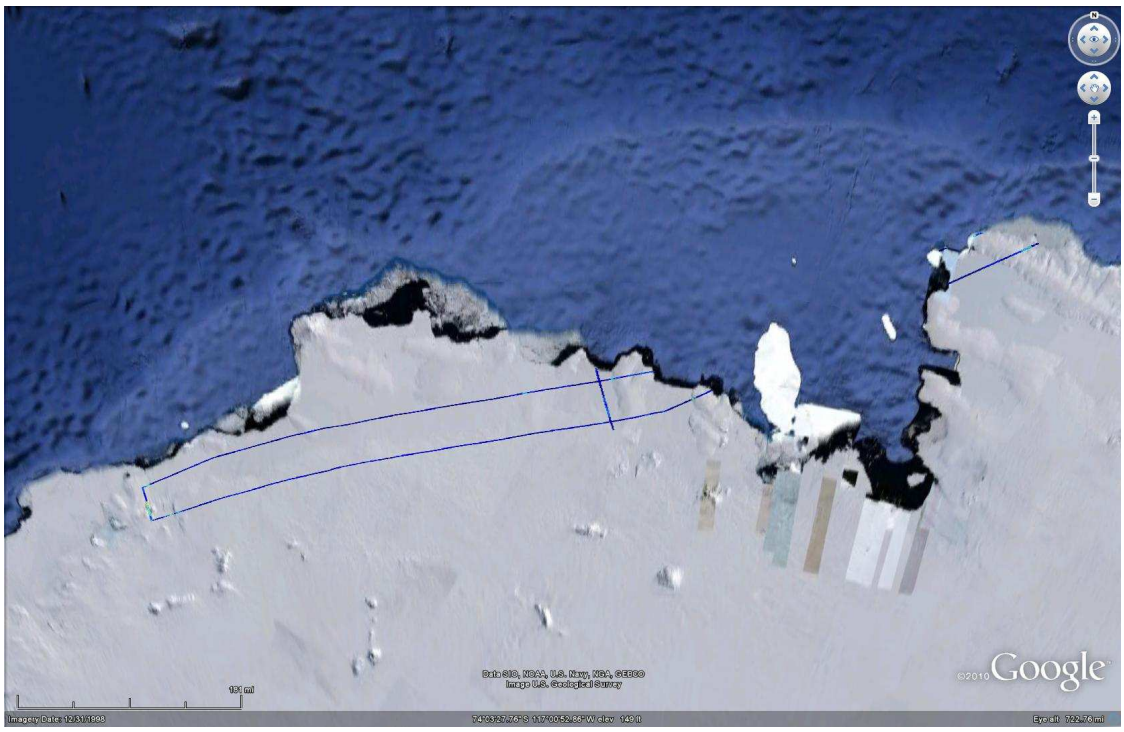


Figure 2.4: getz3_slope_bed: 16.2944

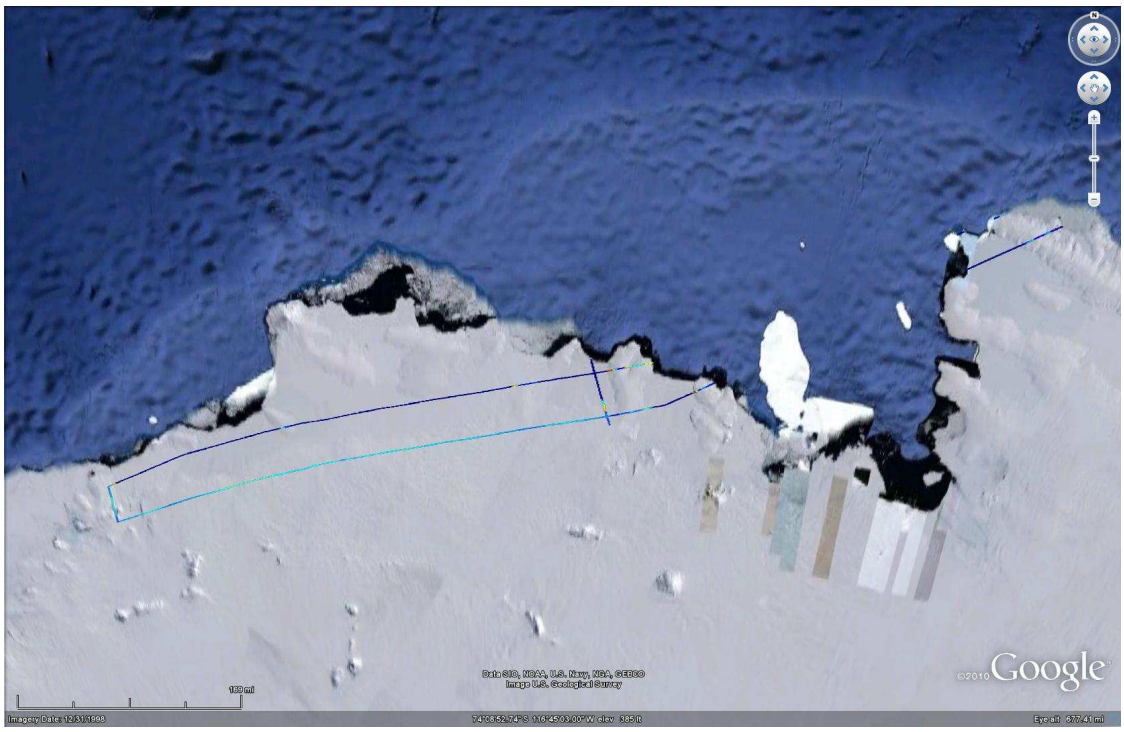


Figure 2.5: getz3_slope_surf: 20.6819

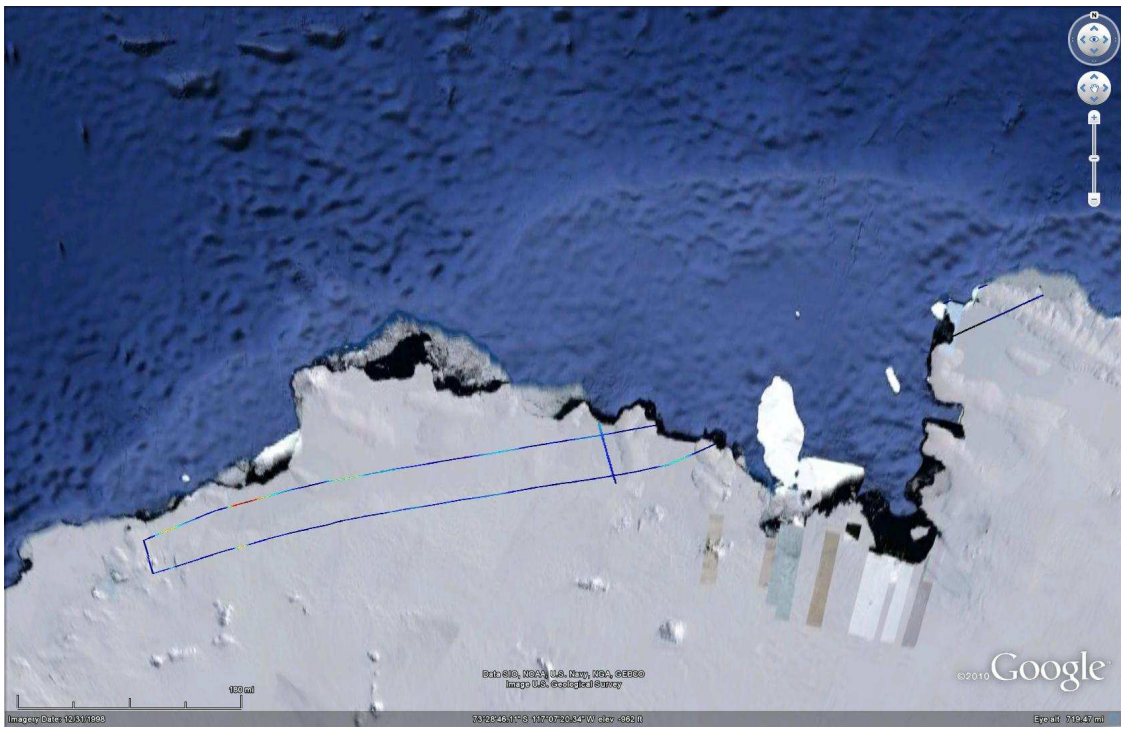


Figure 2.6: getz3_vel_obs: 255483

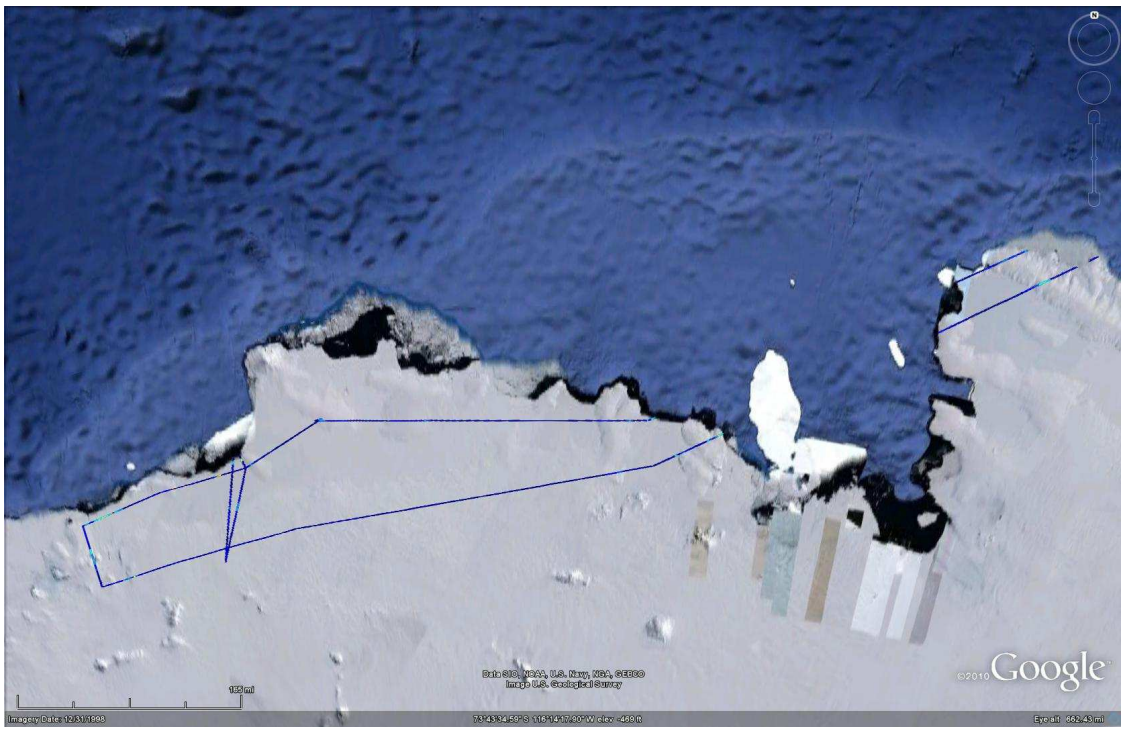


Figure 2.7: getz4_slope_bed: 22.1113

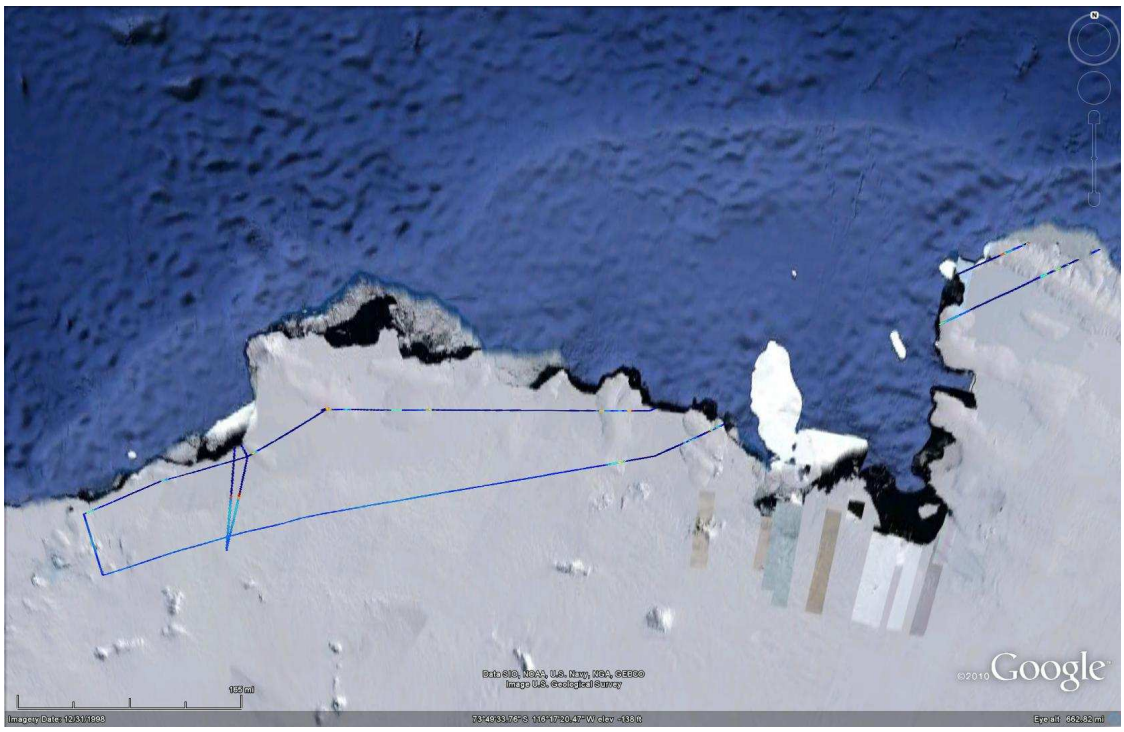


Figure 2.8: getz4_slope_surf: 35.1766

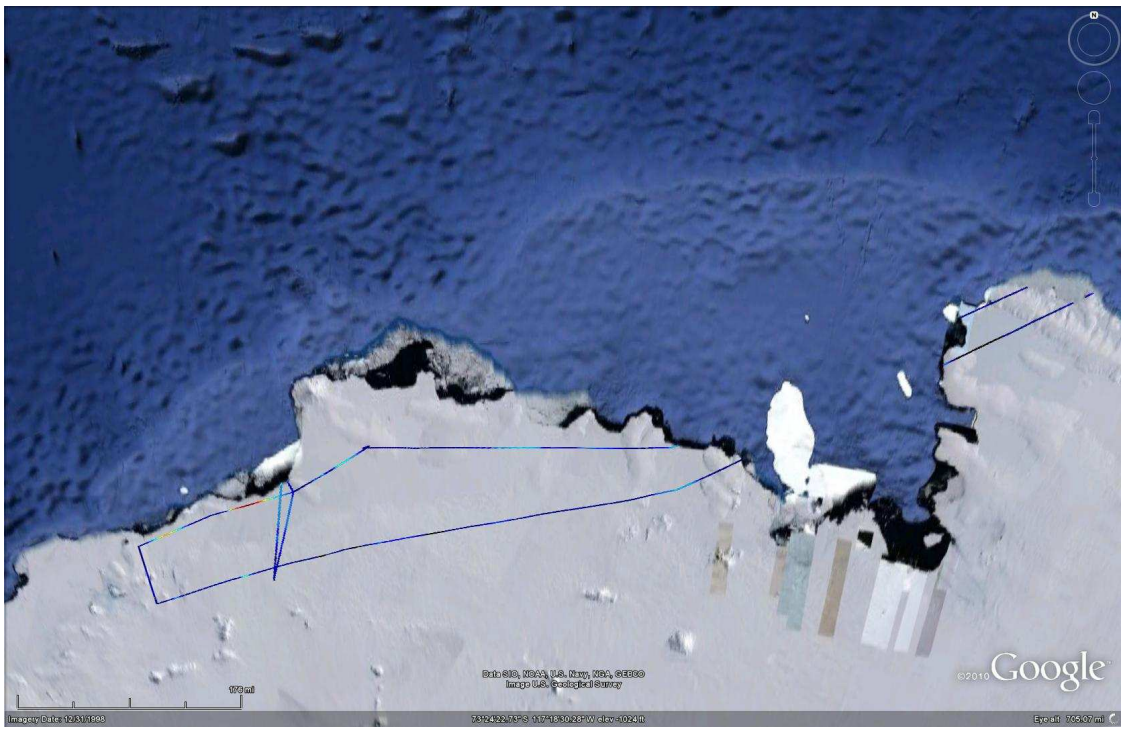


Figure 2.9: getz4_vel_obs: 256348

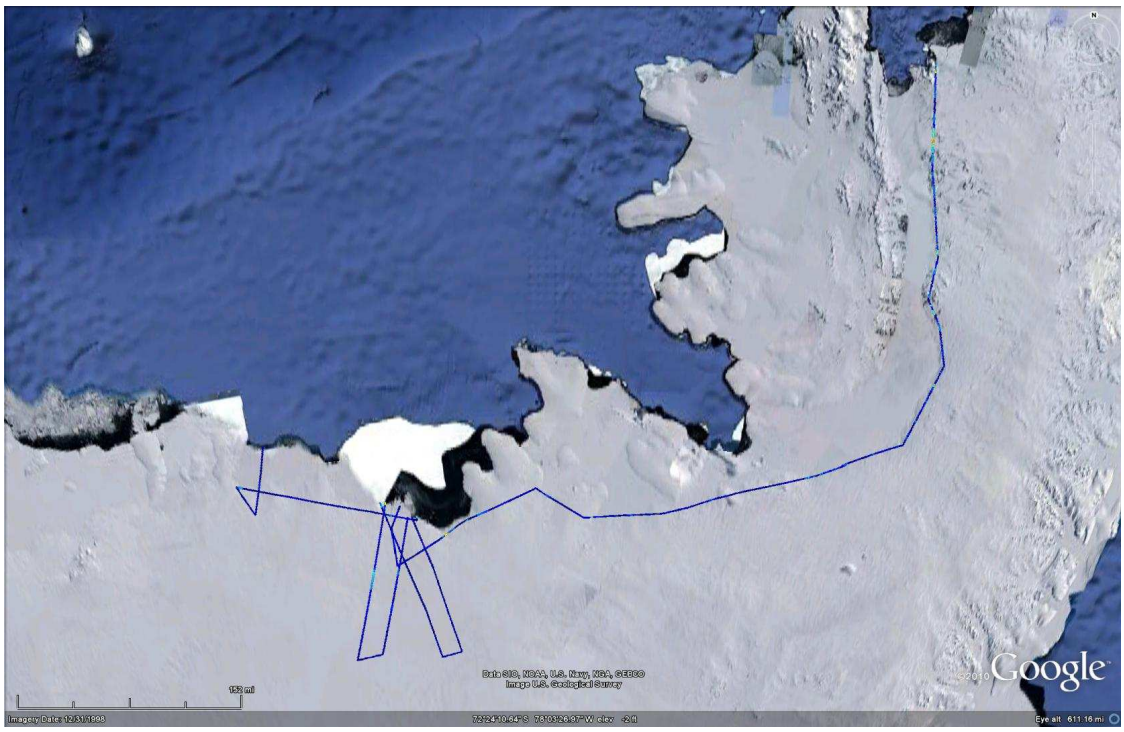


Figure 2.10: pen1_slope_bed: 35.3437

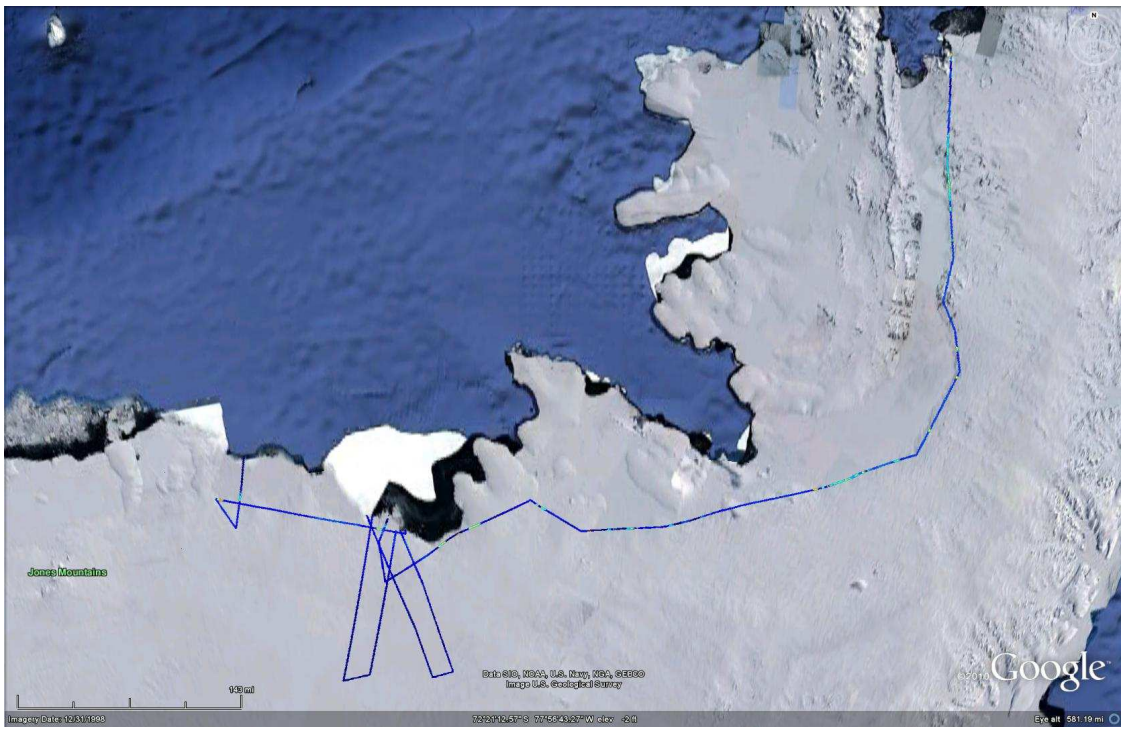


Figure 2.11: pen1_slope_surf: 51.12

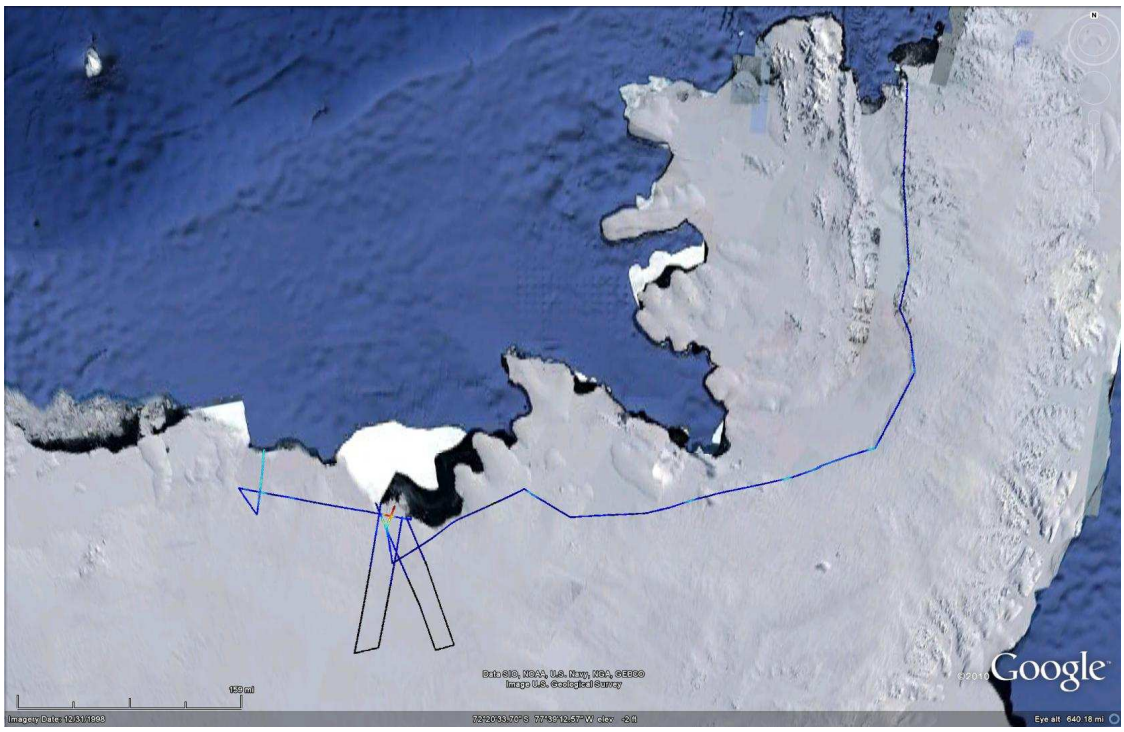


Figure 2.12: pen1_vel_obs: 327735

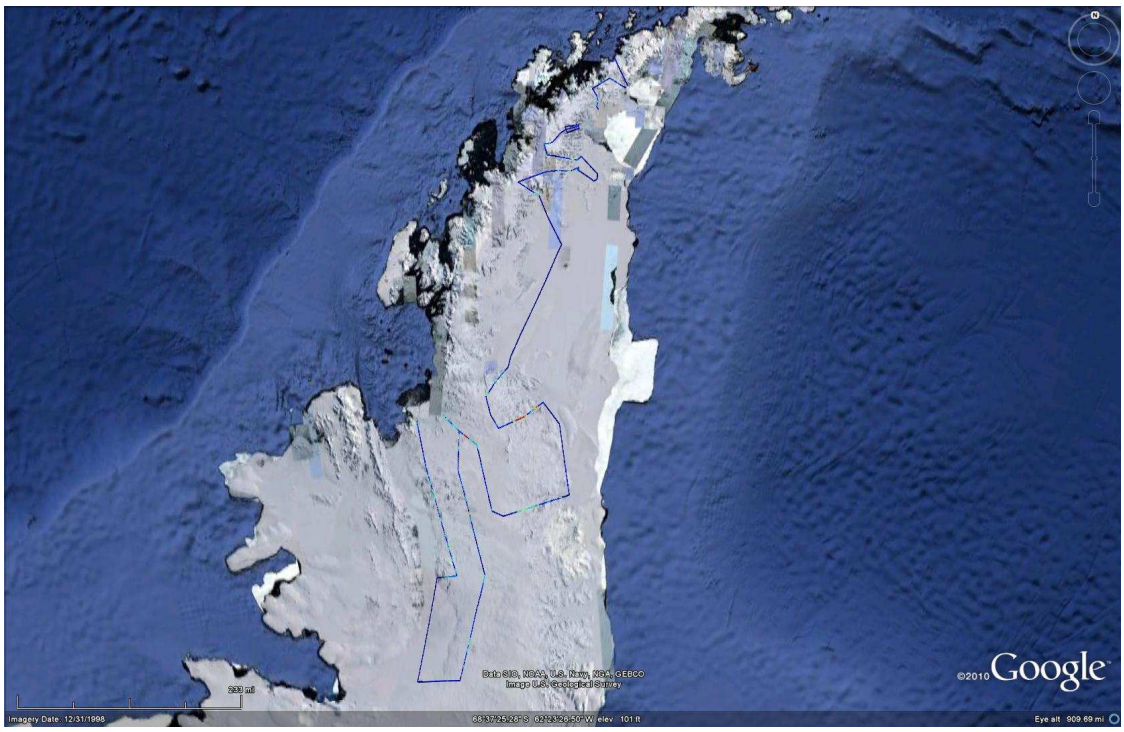


Figure 2.13: pen23_slope_bed: 27.4133

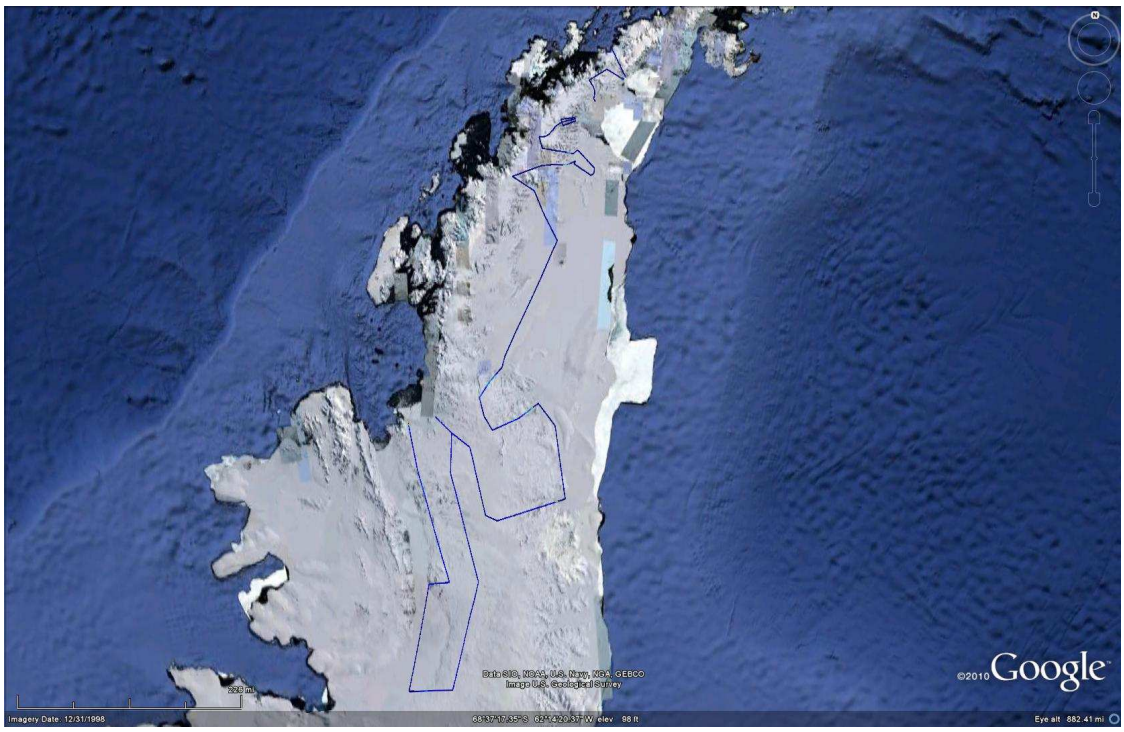


Figure 2.14: pen23_slope_surf: 74.6058

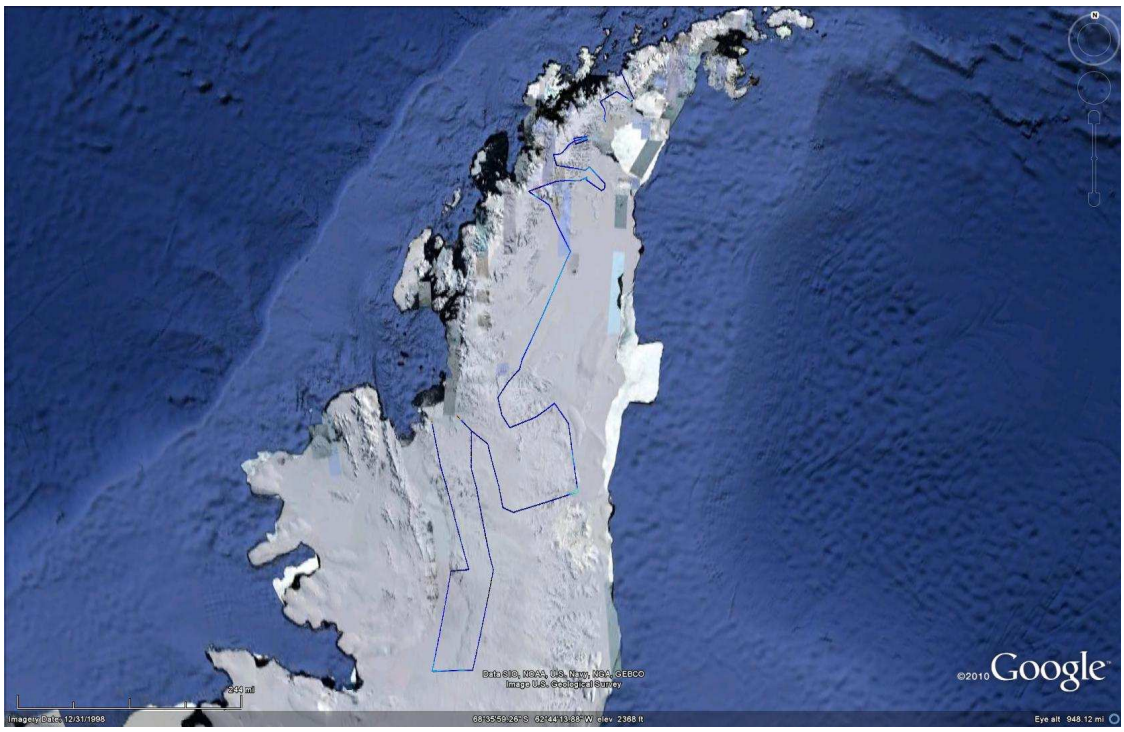
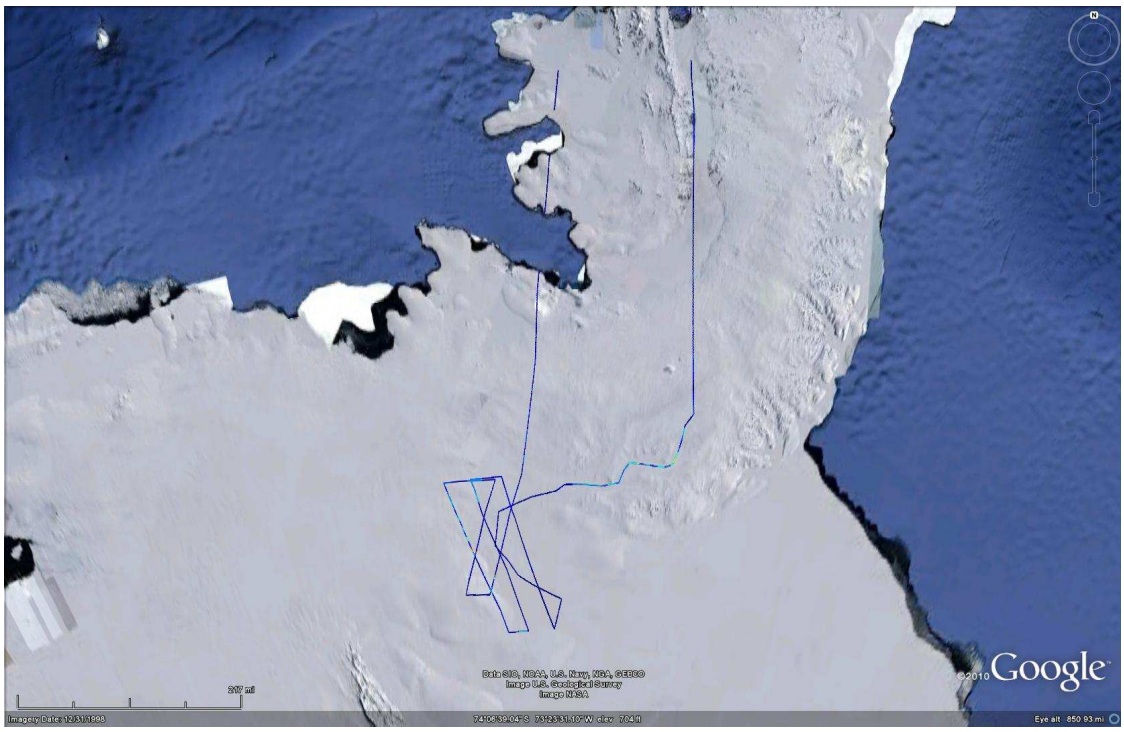


Figure 2.15: pen23_vel_obs: 299100



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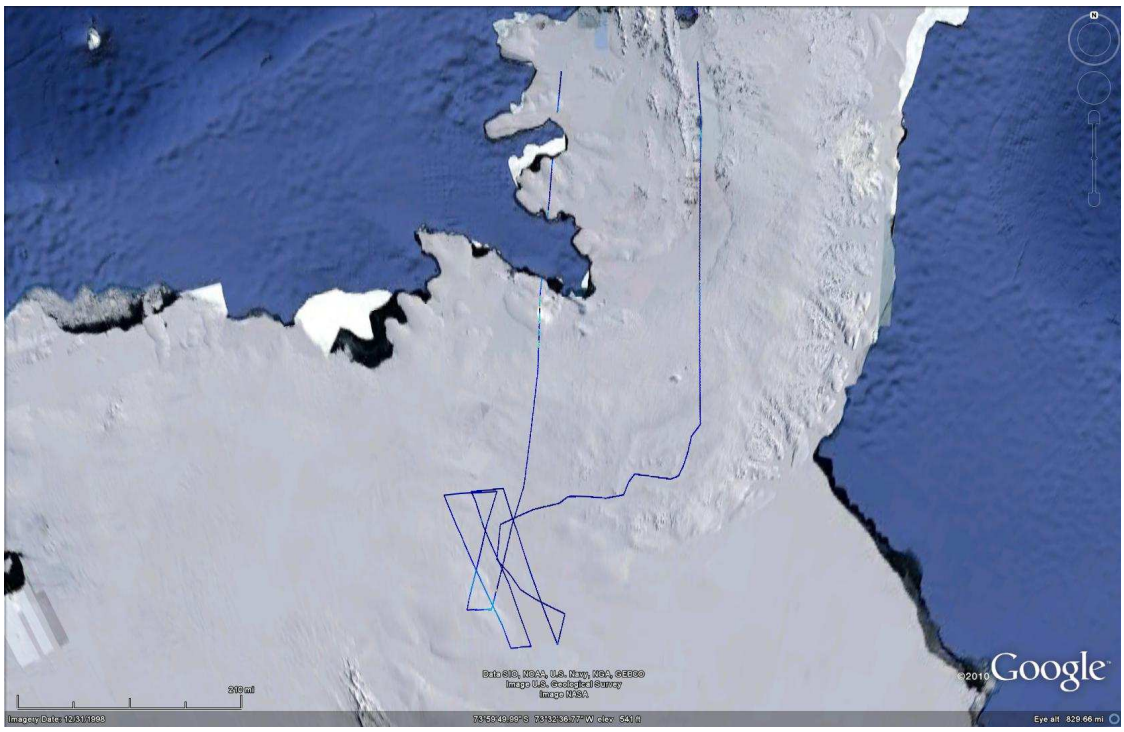

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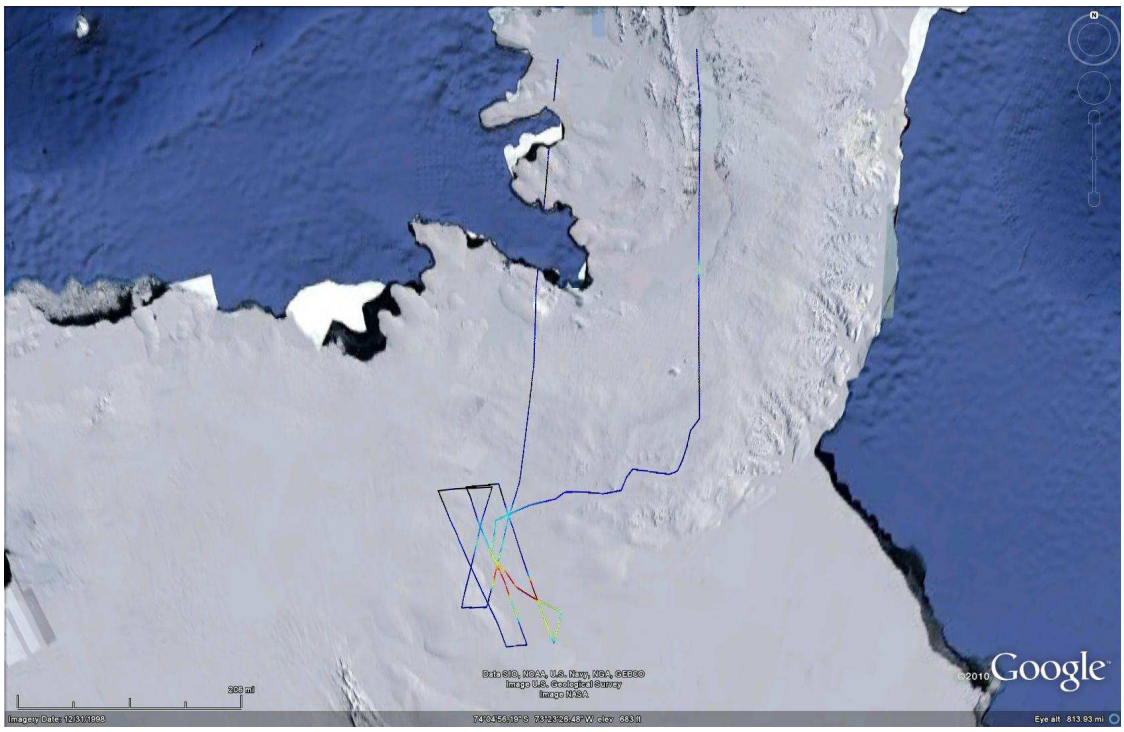

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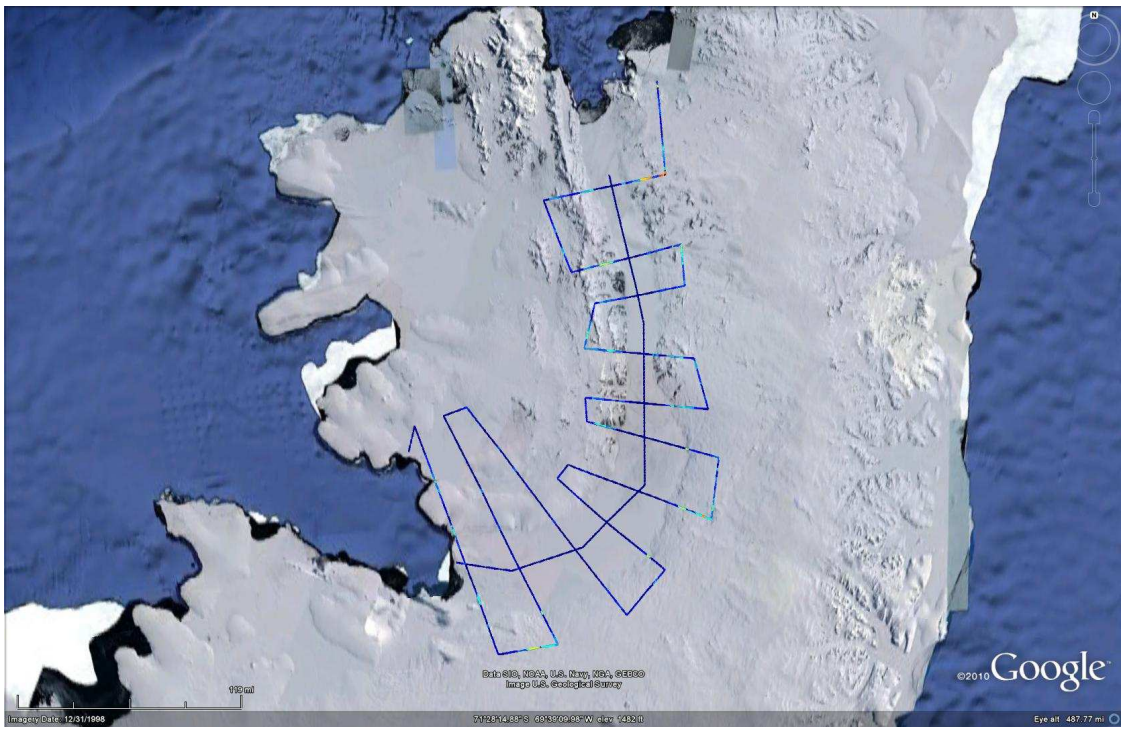

Figure 2.19: pen6_slope_bed: 26.4255

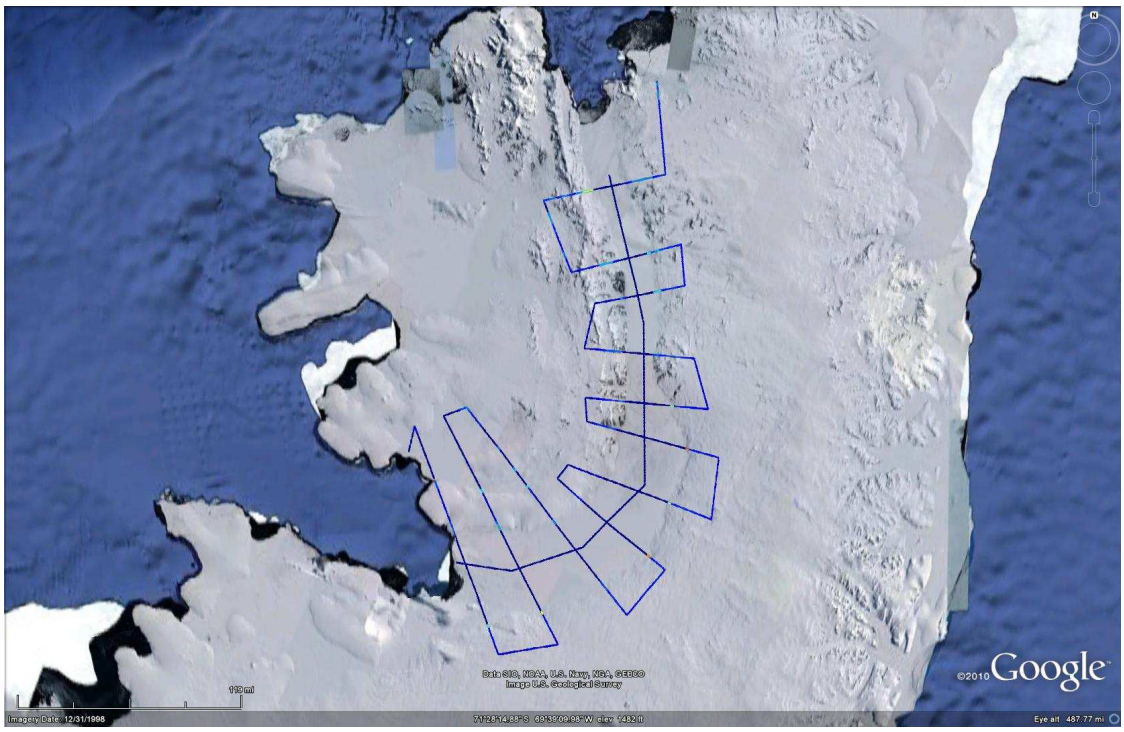

Figure 2.20: pen6_slope_surf: 50.3228

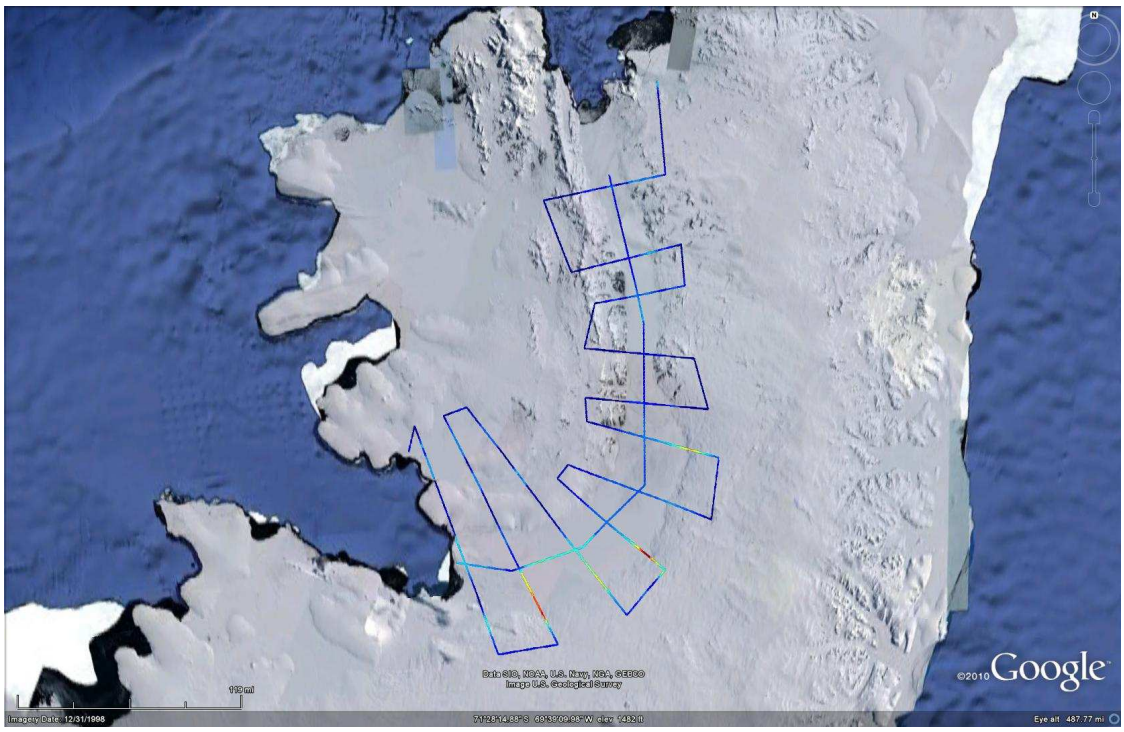

Figure 2.21: pen6_vel_obs: 327840

Chapter 3

Acknowledgements

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